King County
Brightwater
TREATMENT SYSTEM

Brightwater Tunnel Construction and Project Status

About the project

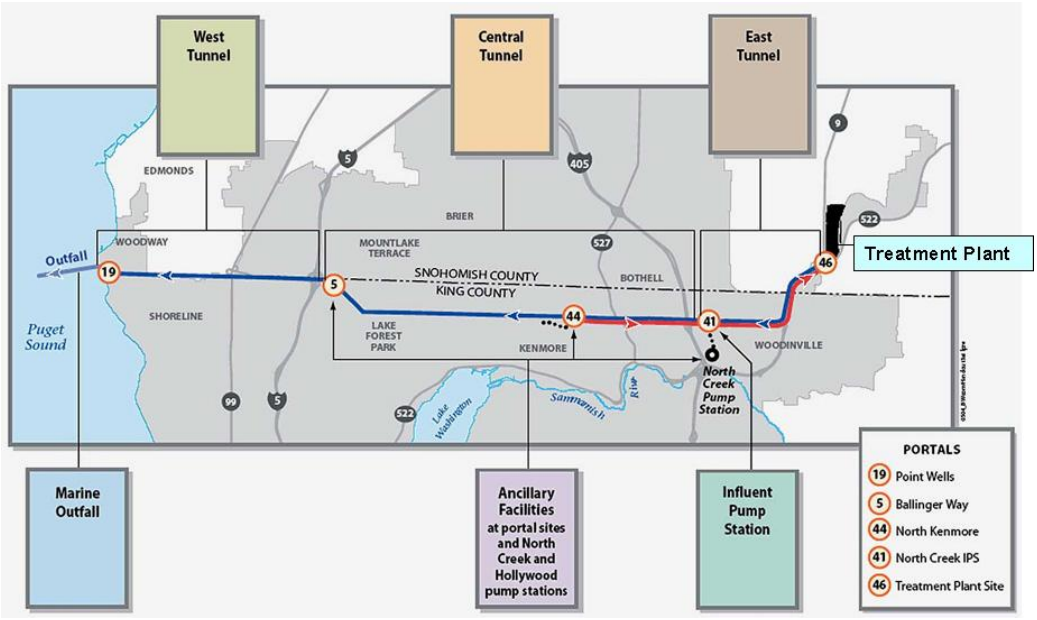
Public debate about the Viaduct tunnel has focused a lot of attention on King County's Brightwater Treatment System project, specifically, the tunnels being built as part of a 13-mile wastewater pipeline. Due to the complexity of the project, information can on occasion be misinterpreted or inaccurately portrayed.

The purpose of this fact sheet is to address misconceptions, highlight construction progress to date and provide an update on the status of key project indicators:

- Mining on 11 of the 13 miles of tunnel is now complete. The project has been overall very successful in terms of meeting budget and schedule goals.
- The project is within 1.4 percent of its original baseline budget established when the project was at 30 percent design in 2004.
- Tunneling projects are complex and unique and apples-to-apples comparisons are largely impossible due to variables in length, diameter, types of machines, contractor means and methods, and soil conditions.
- There are many examples of successful tunneling projects in the region – King County WTD operates 353 miles of pipelines, many of which are in tunnels.

Project Overview

The Brightwater Treatment System is the largest expansion of the regional wastewater system in nearly 50 years. Brightwater includes a treatment plant designed to treat 36 million gallons of wastewater each day, an influent pumping station, 13-miles of conveyance tunnels, and a mile-long marine outfall off Point Wells in Puget Sound. Project construction was divided into seven major contracts, illustrated on the map below. Phased construction began in 2006. Wastewater treatment will begin in August 2011 and the conveyance system will begin operation in late 2012.



Progress to Date

Give the size, scope and complexity of the individual construction contracts, the Brightwater project as a whole has made noteworthy progress since construction began in 2006. Here is a roundup of progress to date:

Treatment Plant

Construction on treatment plant liquid and solids facilities is more than 86 percent complete. Equipment testing will begin this fall and system testing will begin in early 2011. The plant is scheduled to begin treating wastewater in August 2011.

Conveyance System

The marine outfall was completed in 2008 using a design build contract, a year ahead of schedule and 20 percent below budget.

Three of the four tunnels comprising the 13-mile conveyance pipeline are now completed, and as of July 2010, 11 miles of tunneling has been completed.

Mining on the 2.7-mile, 18-foot-diameter East Tunnel between the Bothell Business Park along I-405 and the treatment plant was completed in November 2008. Piping has been installed and contract substantial completion is scheduled for August 1, 2010.

Mining of the four-mile, 13-foot-diameter West Tunnel was successfully completed in June 2010. Remaining work under the contract was suspended and the contract closed out in order to allow the contractor to pursue the construction of the remaining section of the BT-3 tunnel under a new contract.

King County experienced unexpected project delays on the two Central Tunnels range in diameter from 13 to 17 feet after inspections revealed damage on two tunnel boring machines in May 2009. The machines were both idled and the county worked with its contractor, Vinci/Parsons/Frontier-Kemper (VPFK) on a plan to repair the machines and resume tunnel mining.

The eastbound machine, BT-2 or "Helene", was successfully repaired and began mining again in mid February 2010. Mining was completed on the 2.2 mile BT-2 tunnel in June 2010 ahead of the revised construction schedule. The westbound BT-3 machine, nicknamed "Rainier", remains idled. King County opted to remove the BT-3 tunnel from VPFK's scope of work and hired joint venture Jay Dee Coluccio, which completed the four-mile BT-4 tunnel, to complete Brightwater's remaining 1.9 mile segment of tunnel. Tunnel completion is scheduled for late 2012.

How do the Brightwater tunnels compare to the SR 99 - Alaskan Way Viaduct Replacement tunnel proposal?

A plan to replace the Alaskan Way Viaduct with a deep-bore transportation tunnel has generated controversy among people with a variety of reasons for opposing this proposal. While these critics raise legitimate issues that deserve to be part of a public discussion, many comparisons they make between the proposed Viaduct tunnels and the tunnels being built as part of the Brightwater project are largely inaccurate or misleading.

First, tunnel construction is extremely complex and it's difficult to make apples-to-apples comparisons between projects. Tunnel mining machines, tunnel length, engineering designs, construction contract requirements, and ground conditions vary widely from project to project, even in the same region. The Brightwater project's four tunnels range in diameter from 12 to just over 16 feet inside diameter.

It's important to note that three of the four Brightwater tunnels have been completed successfully. Brightwater has already successfully tunneled more than five times the length of the proposed Viaduct project tunnel. Critics also fail to note that two of the tunnels – one four-mile tunnel and another 2.7 mile tunnel – were completed on schedule and within budget.

A past record of tunneling success

Tunnels of various sizes have been successfully built all over the world, including right here in King County. The county's Wastewater Treatment Division currently operates and maintains 353 miles of wastewater pipelines, most of which are in tunnels.

The Wastewater Treatment Division has extensive experience successfully building tunnels in the Seattle metropolitan area prior to Brightwater construction. Recent project completed include the following tunnels, including:

1997: The two-mile-long, 11-foot diameter West Seattle tunnel to transfer flows from the Alki/West Seattle area to the West Point Treatment Plant. At its deepest point, it is 400 feet below the surface.

1990s: The 1.6-mile long, 12-foot-diameter Fort Lawton Tunnel to carry untreated wastewater to the West Point Treatment Plant. This tunnel is about 100 feet below the surface.

2002: The 1.2-mile, 14-foot-diameter Denny Way CSO tunnel that runs beneath Mercer Street from Elliott Bay to Lake Union. Maximum depth is 160 feet.

2004: The 2/3-mile, 15-foot-diameter Henderson CSO project wastewater storage tunnel under Beacon Hill. The tunnels are 30 to 100 feet below ground.

2008: The 2.7 mile, 17-foot-diameter Brightwater East Tunnel, which has a maximum depth of 260 feet.

2010: The 13-foot-diameter, four-mile West Tunnel from Point Wells to Ballinger Way, which has a maximum depth of 400 feet. The 14.4-foot-diameter westbound Central Tunnel, which is 330 feet below ground at its deepest point, was successfully completed in June. Currently, 85 percent of mining on the Brightwater tunnels has been completed.

How will issues related to the Central Tunnel impact project costs?

It is not known at this time how schedule delays and additional costs associated with issues on the Central Tunnel will impact the Brightwater budget. The county will continue negotiating with the companies involved to determine the associated costs and who will ultimately be responsible for paying them.

Project Costs

Brightwater costs have remained relatively stable since the project cost baseline was established in 2004 when the project was at 30 percent design. The current lifetime cost estimate for the Brightwater project is expressed as a range between $1.816 and 1.857 billion, which is $16.1 million higher (0.9 percent) than the January 2009 estimate. When 5 percent inflation is taken into account, Brightwater project costs have only increased a total of 1.4 percent since 2004.

Brightwater Cost Estimates: 2001–2010
Cost Estimates (Inflated) vs. Baseline Budget